

# REMARKS

## I. SPECIFICATION

A terminology change has been made in the English translation of the specification of the above-identified U.S. National Stage Application to provide an English translation of the German term “glassfluss” that is more appropriate for the glass technical arts. This term appears in claims 7 and 8 of the above-identified U.S. National Stage application. This term also appears in the “Practical Examples” section on pages 6 and 7 of the above-identified U.S. Patent Application.

Particularly the English translation of the German word “glassfluss” has been changed from “molten glass” to “glass flux”. German-English Dictionaries for the Chemical Arts, such as “Woerterbuch Chemie” by Gerhard Wenske support this change. Also the disclosure in US Patent 6,043,171, which is the English language equivalent of DE 197 21 737, supports this change. The third paragraph in the background section of US ‘171 explains that ceramic paints or colorants include “glass fluxes”.

In addition, changes have been made to capitalize the trademark COLORSTREAM®, wherever it appears, as required by paragraph 2 on page 2 of the Office Action.

Furthermore the COLORSTREAM® Arctic Fire pigment has been described in generic terms in a paragraph that was added to page 4 of the

specification. Product sheets from the manufacturer, Merck KGaA, are the source of this description, which includes a description of its chemical composition and particle size distribution. These product sheets from Merck KGaA are being filed along with this amendment.

The disclosure on page 4, lines 9 to 11, has been amended to include the preferred amounts of color-flop pigments that are included in the silicate melt from the originally filed claim 11, so that the specification supports the new claim 13, which includes this amount range.

Some minor punctuation, spelling, and grammatical errors were also corrected.

## **II. ABSTRACT**

An abstract has been provided above, which summarizes the subject matter of the new main claim 13 and also the dependent claim that describes the COLORSTREAM® Arctic Fire pigment in more detail.

## **III. CLAIM CHANGES**

New claims 13 to 22 have been added and the original claims 1 to 12 have been canceled.

The sole new independent decorated-glass-ceramic- or glass-article claim 13 contains the features and limitations of claims 1, 2, and 11. Canceled claim 2 limited the special-effect pigments that provide the color-flop effect to SiO<sub>2</sub> platelets coated with at least one metal oxide. Canceled claim 11 included a

preferred amount range for the special-effect pigments in the silicate melt, which was not present in independent claim 1.

Dependent claims 14 to 18 replace claims 3 and 6 for preferred embodiments in which the special-effect pigments are COLORSTREAM® pigments of Merck. No dependent claims have been filed to replace claims 4 and 5 at this time.

Product sheets obtained from Merck KGaA, describing the chemical composition and physical structure of the COLORSTREAM® pigments according to claims 14 to 18, accompany this amendment. These product sheets primarily describe the COLORSTREAM® Arctic Fire pigment. In addition, a technical note from New York SCC regarding Luster-Effect Pigments, including those exhibiting color-flop effects, is also being supplied along with this amendment.

The subject matter of claims 14 to 18 is not “new matter”, because these claims do no more than provide a generic description of the pigment that replaces the description of the pigment using the trade name. For example, claim 14 replaces canceled claim 3, because the COLORSTREAM® pigments are generally silicon dioxide platelets coated with titanium dioxide. This fact is evidenced by the filing of two product sheets for two different COLORSTREAM® pigments, namely Arctic Fire and Tropic Sunrise.

Dependent claims 15 to 18 are supported by the Product Sheet entitled COLORSTREAM® T20-02 WNT Arctic Fire and the accompanying data on the Technical Data Sheet 58090.

New dependent claim 19 is supported by canceled claims 7 and 8, except

New dependent claim 19 is supported by canceled claims 7 and 8, except that the term “molten glass” has been replaced by “glass flux”. The term “glass flux” is a better translation of the German word “glasfluss”, as explained above.

New dependent claims 20, 21, and 22 are supported by canceled claims 9, 10, and 12.

#### **IV. FORMAL CLAIM REJECTIONS AND OBJECTIONS**

The objection to claims 1 and 9 has been obviated by their cancellation. None of the new claims contain inappropriate hyphenated words.

The rejection of claims 3 to 6 as indefinite has been obviated by their cancellation. The new dependent claims do not contain trade names or trademarks.

The description of the pigments with the trademark has been replaced by a generic description obtained from the manufacturer’s product sheets, as required by U.S. Patent Policy and 35 U.S.C. 112 and as explained above in the section regarding specification changes.

New claim 13 claims a decorated glass ceramic or glass article comprising a glass ceramic or glass body decorated with a colorant that provides a color-flop effect when viewed. The decorated glass ceramic or glass article can withstand or be subjected to high thermal loads as explained on page 4, lines 1 to 7, of the English translation of the specification. Otherwise new claim 13 combines the subject matter of claims 1, 2, and 11, but retains the wording of these claims, which was not found to be indefinite as stated in the Office Action.

For the foregoing reasons it is respectfully submitted that new claims 13 to 22 should not be rejected under 35 U.S.C. 112, second paragraph.

## **V. OBVIOUSNESS REJECTIONS**

### **1. de Witzmann, et al, in view of Eppler, et al**

Claims 1 to 12 were rejected as obvious under 35 U.S.C. 103 (a) over Cotlear de Witzmann, et al, U.S. Patent 6,794,020 (referred to as US '020 herein below), in view of Eppler, et al (US Patent 5,783,506 -- referred to as US '506 herein below).

US '020 discloses a glass ceramic panel that has a decoration provided by application of a colorant or paint to the glass ceramic panel. The colorant or paint is based on a glass flux or glass frit in which pigments are embedded. The glass flux or glass frit of the above dependent claim 19 does have a glass composition that is similar (quite close) to that disclosed in US '020 at column 7, lines 40 to 56.

However the pigments included in the glass flux or glass frit of the present claimed invention are entirely different from the pigments included in the glass flux of US '020. The Office Action on page 7 correctly recognizes that the special-effect pigments that provide color-flop properties to the decorated article are not disclosed or suggested in US '020.

Furthermore US '020 does **not** suggest using the color-flop pigments of

ceramic or glass body, because US '020 teaches other different ways to make usage marks and scratches that may appear on the decorated article in usage inconspicuous (which is the object or purpose of the invention in US '020 according to column 4, lines 5 to 13, and also an object of the present invention claimed above according to page 2, lines 26, to page 3, line 3). These other different ways include controlling the color parameters, such as L\* (lightness), by selection of particular pigments with predetermined color properties (column 5, lines 48 to 57) and by providing two-tone decorations and special grids or patterns with different colorants (column 8, lines 14 to 18).

Thus US '020 leads one skilled in the art away from the new solution to the same problem (the appearance of scratches, dirt and usage marks on the glass ceramic article) that is claimed in the above new claims 13 to 22, because it teaches a solution that uses pigments that do not provide a color-flop effect and which act to conceal the scratches, dirt and usage marks by means of different properties or by patterning (two-toned) surfaces.

US '506 does disclose a ceramic glaze for a glass ceramic article, such as a tile, containing uncoated mica and a pearlescent pigment comprising iron-oxide or titanium-oxide coated mica (column 1, lines 5 to 10, and column 3, lines 1 to 10).

**A. The Combination of US '202 with US '506 Does Not Lead  
To the Claimed Invention according to New Claim 13**

US '506 describes a paint or glaze for a glass ceramic article containing pearlescent pigments based on mica flakes, whereas claim 13 claims a paint or colorant based on amorphous  $\text{SiO}_2$  flakes. Mica is an entirely different material from the amorphous  $\text{SiO}_2$  flakes with a significantly different structure that leads to different properties.

Mica is a mineral belonging to the class of alumino-silicates having a sheet structure. Mica can easily be split into very thin layers and has a combination of light weight, stiffness, elasticity and thinness. Mica itself has extraordinary heat resistance. Early windows in furnaces for observing flames or glow were made of mica until the deposits of high quality (colorless) mica were exhausted.

Thus mica is a mineral well known for its temperature resistance and its fissibility. Mica-based pigments are known for their heat resistance. The mica-based pigments from MERCK are sold under the trademark IRIODIN® and that pigment is discussed in the background section on page 2 of applicants' specification.

It should be noted that US '506 discloses that it was difficult to make a decorative coating or paint using the coated mica flakes because they tend to dissolve in the glass frit or flux at the high temperatures employed to fire or bake

the paint on the substrate (column 1, lines 29 to 35). US '506 employs several techniques to overcome this problem. First a special fast fire or fast bake process is used to provide the decorative layer (column 3, lines 49 to 55) so that there is insufficient time for the dissolving process to occur. Second both uncoated and coated mica flakes are added to the glass flux or frit prior to baking the decoration on the glass ceramic substrate. The uncoated mica helps to slow the dissolving process according to column 2, lines 30 to 35.

The argument that one skilled in the art would find it obvious to replace the mica-based coated pigments of US '506 with the  $\text{SiO}_2$ -platelet-based pigments of the invention as claimed in claim 13 is based on the assertion that mica is also a "sheet silica", much like graphite is a "sheet carbon". However mica is not pure amorphous silica, which lacks some of the important properties of mica.

Furthermore the analogy between the relationship of mica to silica and the relationship of graphite to carbon ignores important differences. Diamond and graphite both consist solely of elemental carbon. They are allotropic forms of the element C. However mica and amorphous silica are entirely different compounds with different chemical formulae and of course different structures. Quartz (crystalline) or amorphous silica consists of  $\text{SiO}_2$ . Mica, however, is a complex compound of the class: alumino-silicates. The well-known ordinary mica (muskovite) has the formula  $\text{KAl}_2 [\text{Al Si}_3\text{O}_{10}] (\text{OH}, \text{F})_2$ . Furthermore if carbon and graphite can have such great differences in their properties while still consisting of elemental carbon, it is not difficult to understand that silica and mica are not



comparable in structure, composition and properties. They are certainly not exchangeable with each other as suggested on page 8 of the Office Action.

Combining US '506 with US '202 in the manner suggested in the paragraph at the bottom of page 8 of the Office Action would of course result in a paint or glass with the pearlescent pigment comprising metal-oxide coated mica flakes. However this combination is not the invention claimed in the new claim 13 because amorphous silica flakes are entirely different from the mica flakes. In the next part of these arguments to overcome the obviousness rejection we show that one skilled in the art would not make the proposed replacement of the pigments of US '202 with those of US '506.

Teaching in the references or the prior art generally that would lead one skilled in the art away from the claimed invention must be fairly considered in formulating a rejection under 35 U.S.C. 103 (a). See M.P.E.P. 2145 X, for example.

One skilled in the glass arts would **not** replace the mica-based pigment of US '506 with metal oxide coated silica flakes because of the problem described in US '506 regarding the tendency of the pigments to dissolve in the glass flux or frit. In order to produce the color-flop effect the pigment platelets cannot be allowed to dissolve to form a homogenous vitreous layer. It is well known in the glass arts that  $\text{SiO}_2$ , which has a melting temperature of  $1705^\circ\text{C}$ , dissolves in a glass melt or during formation of a melt from a glass batch, which is the basis for all processing glass. For common soda lime glass dissolution of  $\text{SiO}_2$  is complete for example at  $900^\circ\text{C}$ . Thus one would expect silica flakes to dissolve during

baking on of the glass frit or flux. In contrast, mica has great heat resistance and thus resists such dissolution to some extent, but special procedures as noted above must be performed as disclosed in US '506 even with mica flakes.

The accompanying Technical Data Sheets of Merck would also lead one skilled in the art from replacing the mica flakes of US '506 with the silica flakes or platelets of claim 13 because they state that the COLORSTREAM® Arctic Fire pigments are only heat stable up to 230°C. Thus it is surprising that the colorant can be made with the glass flux of US '020 and the COLORSTREAM® Arctic Fire pigments and that it can be used to make a decoration on the glass ceramic or glass body, which can be subject to high heat loads as claimed in claim 13 and which can be used to provide a cooking surface as claimed in dependent claim 22.

#### **B. The disclosures of US '202 and US '506 Would Not be Combined By One Skilled in the Art**

US '506 does not discuss the problem of making usage marks, such as dirt and fingerprints, inconspicuous on the surface of the glaze inconspicuous. The Background Section of the applicants' specification on page 2 clearly teaches that coated mica pigments will make usage marks on the colorant or paint surface **more** conspicuous, because of the interruption of the uniformity of the appearance of the pearlescent surface (page 2, lines 25 to 30, of the English translation of applicants' specification). Furthermore the IRIODIN® pearlescent pigment, given as an example on page 2 of the specification, is a metal-coated

**mica pigment** with a pearly luster, according to Merck KGaA (Product description is available from Merck via the usual Internet search engines).

Thus if the problem to be solved is to make usage marks including dirt and fingerprints less conspicuous, **one would be led away** from the use of a colorant containing a glass flux or frit and the coated **mica** pearlescent pigments of US '506, because according to the background section in applicants' page 2 pearlescent coated mica pigments should be avoided. On the other hand, the disclosure in the applicants' specification teaches that the colorant based on the glass flux according to the COLORSTREAM® pigments and the original claim 8 that provide the color-flop effect unexpectedly make usage marks less conspicuous.

Thus the motivational statement at the bottom of page 8 of the Office Action is reasonable only in so far as it is true that **any** pigment that provides an aesthetically pleasing appearance could be included in the glass flux or glass frit of US '020 to make a glaze. The existence of a great number of inorganic pigments with suitable thermal properties in the prior art should not be ignored. The aforesaid motivational statement would lead to an uncountable large number of possible pigments for use with the glass frit or flux of US '020, many of which would be unsatisfactory for the purposes of US '020 and of the present invention.

When an uncountable large number of possible choices remain for one skilled in the art, a single choice is not obvious. In other words, why would one skilled in the art single out US '506 instead of picking some other prior art references that discloses another pigment that also provides an aesthetically

pleasing color? US judicial opinions have often held that “obvious to try” is not an adequate basis for combining disclosures of prior art references for a rejection under 35 U.S.C. 103 (a).

Furthermore in the case of the present claimed invention if the suggested modification of the colorant or paint of US ‘020 based on the disclosures in US ‘506, namely replacement of the pigments of US ‘020 with the coated mica pearlescent pigments of US ‘506, is made, then the colorant or paint of US ‘020 would be changed in a manner that is unsatisfactory for its stated purpose, concealment of usage marks, according to the background section on page 2 of the applicants’ specification.

According to M.P.E.P. 2143.01 V a valid obviousness rejection under 35 U.S.C. 103 (a) cannot be based on reasoning that requires that the disclosures of the primary reference, such as US ‘020, must be modified in a manner that is unsatisfactory for their intended purpose. Thus US ‘506 would not suggest to one skilled in the art that their coated mica pearlescent pigments could be used in the coated glass ceramic article of US ‘020 because that change would make it more difficult to conceal usage marks, such as dirt and fingerprints, according to page 2 of applicants’ specification.

For the foregoing reasons and because of the new limitations in the claims, it is respectfully submitted that new claims 13 to 22 should **not** be rejected as obvious under 35 U.S.C. 103 (a) over Cotlear de Witzmann, et al, in view of Eppler, et al.

## **2. de Witzmann, et al, in view of Vogt, et al**

Claims 1 to 12 were rejected as obvious under 35 U.S.C. 103 (a) over Cotlear de Witzmann, et al, U.S. Patent 6,794,020 (referred to as US '020 herein below), in view of Vogt, et al, US Patent 6, 238,471 (referred to as US '471 herein below).

US '471 does teach a process for coating platelets of a carrier material, with plural coating layers including a layer comprising inorganic or organic pigments (column 2, lines 55 to 60), to form an interference pigment (column 1, lines 44 to last line; claim 1). The platelets can be made of a number of different carrier materials, including mica and silicon dioxide (column 2, lines 61 to 67; claim 2). Metal oxide pigments, such as titanium dioxide, are particularly preferred (claim 2; example 2).

US '471, not surprisingly, is owned by Merck, who is the manufacturer of the color-flop producing pigments that are characterized by the trademark COLORSTREAM®.

However US '471 does not teach a colorant comprising a glass flux in which the aforesaid pigments are contained. The Office Action reasons that it would have been obvious to incorporate the pigments of US '471 in the paint or colorant disclosed in US '020 comprising the glass flux and the titanium-coated silica platelets described in US '471.

The motivational statement in the last paragraph on page 9 of the Office

Action has already been addressed in the above section. Reference is made to the above-section for a more detailed discussion.

**When an uncountable large number of possible choices remain for one skilled in the art, a single choice is not obvious.** For that reason it has often been held that “obvious to try” (in this case a particular known pigment) is not an adequate basis for combining disclosures of prior art references for a rejection under 35 U.S.C. 103 (a). One skilled in the art would find no more motivation to include silica platelets in the glass flux of US ‘020 the prior art of record than from a Handbook containing an exhaustive list of inorganic pigments.

There is no teaching or suggestion in either US ‘020 or US ‘471 that the coated platelet pigments of US ‘471 should be included in a decorative paint for a glass ceramic article. In other words, US ‘471 does not disclose or suggest that they could be incorporated in a paint or colorant comprising the pigments and a glass flux, like the paint or colorant of US ‘020, and that the paint or colorant could be applied to a glass ceramic article and subjected to a subsequent bake on procedure.

The Office Action in the next to last paragraph on page 9 notes that Vogt, et al, teach that their silicon dioxide platelets coated with multiple layers of metal oxides, such as titanium oxide, are heat stable because they can be fired and calcined at a temperature of 1000°C (example 2 of US ‘471).

However this latter teaching regarding the heat stability of the individual metal oxide-coated silicon dioxide platelets is **not the same** as stating that the metal oxide-coated silicon dioxide platelets would not dissolve in a melted glass

flux during a bake on process or melting process in which the pigment is contained in the glass flux. If the metal oxide-coated silicon dioxide plates dissolve in the glass flux, then the resulting coating would have a uniform color and would not exhibit the color-flop effect, as claimed in claim 13.

It would be surprising to one skilled in the art that the silicon dioxide platelets coating with a thin layer of metal oxide, such as  $\text{TiO}_2$ , would **not** dissolve in the glass flux during the standard thermal processing to produce the decorative coating on the glass ceramic article. This has been discussed in section 1 above, but is repeated here to some extent.

It is well known that  $\text{SiO}_2$ , which has a melting temperature of  $1705^\circ\text{C}$ , dissolves in a glass melt. For common soda lime glass  $\text{SiO}_2$  is completely dissolved at  $900^\circ\text{C}$ . Thus one skilled in the glass arts would expect the silica flakes to dissolve during baking on of the paint or colorant on the glass ceramic article, at least without a special coating procedure or some other special measures, and thus lose their color-flop effect. In contrast, mica has greater heat resistance and thus resists such dissolution to some extent, but the special procedures, as noted above, must be performed, as disclosed in US '506, in order to incorporate the coated mica flakes in a paint or colorant comprising the coated mica flakes and a glass flux.

Thus the general knowledge of one of ordinary skill in the glass arts (which should not be ignored) would prevent him or her from replacing the pigments of US '020 with metal-coated silica platelets of US '471 for the foregoing reasons in order to obtain the invention as claimed in claim 13. It would

be expected that these latter pigments would dissolve in the glass flux at the high processing temperatures during application to the glass ceramic article so that the resulting decoration would not exhibit color-flop.

The accompanying Technical Data Sheet of Merck would also lead one skilled in the art from replacing the mica flakes of US '506 with the silica flakes or platelets of claim 13, because they state that the COLORSTREAM® Arctic Fire pigments are only heat stable up to 230°C. Thus it is surprising that the colorant can be made with the glass flux of US '020 and the COLORSTREAM® Arctic Fire pigments and that it can be used to make a decoration on the glass ceramic or glass body, which can be subject to high heat loads as claimed in claim 13 and which can be used to provide a cooking surface as claimed in dependent claim 22.

This latter reason for withdrawal of the obviousness rejection is also explained in the paragraph running from page 3 to page 4 of the applicants' US specification.

It should also be noted that the chemical composition and physical structure of the COLORSTREAM® Arctic Fire pigments is different from the composition and physical structure of the coated silica particles described in example 2 of US '471 so that relative heat stabilities of these different pigments would not be predictable. Further the calcination process of example 2 of US '471 is part of the process for making the particulate in the first place and is conducted under different conditions than are involved in simply exposing the finished platelets to a high heat load, especially when they are part of a paint or



colorant.

For the foregoing reasons and because of the new limitations in the claims, it is respectfully submitted that new claims 13 to 22 should not be rejected as obvious under 35 U.S.C. 103 (a) over Cotlear de Witzmann, et al, in view of Vogt, et al.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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